1. An apparatus to cancel echo and crosstalk interference in a receiver of a communication system having simultaneous bidirectional transmission and receiving on a communication medium comprising:

an adaptive correlator connected to a receiving circuit to acquire received signals from said communication medium, and connected to at least one of a plurality of transmission channels of said communication system to acquire at least one transmitted signal from the transmission channels, whereby said adaptive correlator generates filter coefficients representing an echo response of the received signals to echo and crosstalk interference from said transmitted signals at an arrival of each received signal; and

a finite impulse filter connected to the receiving circuit to acquire the received signals, and connected to the adaptive correlator to receive a plurality of the filter coefficients, which when combined with the received signals cancels any echo and crosstalk interference from said received signals;

whereby said filter coefficients are regenerated in the adaptive correlator at the arrival of each received signal and whereby each new filter coefficient is a weighted sum of a previous coefficient and one received signal multiplied by a time delayed version of one transmitted signal.

2. The apparatus of claim 1 wherein the adaptive correlator comprises:

at least one first delaying means connected to one of the transmission channels to delay one of the transmitted signals;

at least one first multiplying means connected to the receiving circuit and one of the first delaying means to multiply the received signal by one delayed transmitted signal to produce a product of the received signals and the one delayed transmitted signal;

at least one second multiplying means connected to one of the first multiplying means to receive the product of the received signals by the one delayed transmitted signal and multiply said product by a first weighting factor to produce a first intermediate coefficient factor;

at least one second delaying means to delay and retain the previous coefficient;

at least one third multiplying means connected to one second delaying means to multiply the previous coefficient by a second weighting factor to produce a second intermediate coefficient factor; and

at least one summing means connected to one second multiplying means and one third multiplying means to add the first intermediate coefficient factor and the second intermediate coefficient factor to produce one new filter coefficient.

3. The apparatus of claim 2 wherein the first weighting factor is a quotient of the second weighting factor divided by a variance of the transmitted signal.

4. The apparatus of claim 2 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

5. The apparatus of claim 1 wherein the received signals and the transmitted signals are digitized to form binary numbers indicating magnitudes of samples of the received signal and the transmitted signal.

6. The apparatus of claim 5 wherein the adaptive correlator is comprising:

at least one first delaying means connected to one of the transmission channels to receive and delay on of the digitized samples of the transmitted signal;

at least one first shifting means connected to the receiving circuit and one of the first delaying means to shift one of the digitized samples of the received signal according to the binary number of the one digitized sample of the transmitted signal to produce the received signal and the one time delayed transmitted signal;

at least one second shifting means to shift the product of the received signal and the one time delayed transmitted signal by a first

weighting factor to form a weighted product of the received signal and the one time delayed transmitted signal;

at least one second delaying means to delay and retain the previous coefficient;

at least one adder/subtractor means connected to one second shifting means and one second delaying means to combine the previous coefficient with the weighted product to form a partially weighted sum;

at least one third shifting means connected to one adder/subtractor to shift the partially weighted sum by a second weighting factor to form an intermediate weighted sum;

at least one adding means connected to one second delaying means and to one third shifting means to additively combine the partially weighted sum and the intermediate weighted sum to generate the new filter coefficient.

7. The apparatus of claim 6 wherein the first weighting factor is the inverse of the variance of the transmitted signal.

8. The apparatus of claim 6 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

9. A communication system having simultaneous bi-directional communication on multiple communication media comprising:

a plurality of transmitters, whereby each transmitter is connected to one end of one communication medium and induces crosstalk interference to other transmission media,

a plurality of receivers, whereby each receiver is connected in parallel with one transmitter at one end of one communication medium and receives an echo interference and the crosstalk interference from those transmitters at a same end of the communication medium as the receiver, and wherein each receiver comprises;

a receiver circuit to acquire received signals from the communication medium, and

at least one apparatus to cancel the echo interference and the crosstalk interference comprising;

an adaptive correlator connected to a receiving circuit to acquire received signals from said communication medium, and connected to at least one of a plurality of transmitters of said communication system to acquire at least one transmitted signal from the transmitters, whereby said adaptive correlator generates filter coefficients representing an echo response of the received signals to echo and

crosstalk interference from said transmitted signals at an arrival of each received signal; and

a finite impulse filter connected to the receiving circuit to acquire the received signals, and connected to the adaptive correlator to receive a plurality of the filter coefficients, which when combined with the received signals cancels any echo and crosstalk interference from said received signals;

whereby said filter coefficients are regenerated in the adaptive correlator at the arrival of each received signal and whereby each new filter coefficient is a weighted sum of a previous coefficient and one received signal multiplied by a time delayed version of one transmitted signal.

10. The communication system of claim 9 wherein the adaptive correlator comprises:

at least one first delaying means connected to one of the transmitters to delay one of the transmitted signals;

at least one first multiplying means connected to the receiving circuit and one of the first delaying means to multiply the received signal

by one delayed transmitted signal to produce a product of the received signals and the one delayed transmitted signal;

at least one second multiplying means connected to one of the first multiplying means to receive the product of the received signals by the one delayed transmitted signal and multiply said product by a first weighting factor to produce a first intermediate coefficient factor;

at least one second delaying means to delay and retain the previous coefficient;

at least one third multiplying means connected to one second delaying means to multiply the previous coefficient by a second weighting factor to produce a second intermediate coefficient factor; and

at least one summing means connected to one second multiplying means and one third multiplying means to add the first intermediate coefficient factor and the second intermediate coefficient factor to produce one new filter coefficient.

11. The communication system of claim 10 wherein the first weighting factor is a quotient of the second weighting factor divided by a variance of the transmitted signal.

12. The communication system of claim 10 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

13. The communication system of claim 9 wherein the received signals and the transmitted signals are digitized to form binary numbers indicating magnitudes of samples of the received signal and the transmitted signal.

14. The communication system of claim 13 wherein the adaptive correlator is comprising:

at least one first delaying means connected to one of the transmitters to receive and delay on of the digitized samples of the transmitted signal;

at least one first shifting means connected to the receiving circuit and one of the first delaying means to shift one of the digitized samples of the received signal according to the binary number of the one digitized sample of the transmitted signal to produce the received signal and the one time delayed transmitted signal;

at least one second shifting means to shift the product of the received signal and the one time delayed transmitted signal by a first weighting factor to form a weighted product of the received signal and the one time delayed transmitted signal;

at least one second delaying means to delay and retain the previous coefficient;

at least one adder/subtractor means connected to one second shifting means and one second delaying means to combine the previous

coefficient with the weighted product to form a partially weighted sum;

at least one third shifting means connected to one adder/subtractor to shift the partially weighted sum by a second weighting factor to form an intermediate weighted sum;

at least one adding means connected to one second delaying means and to one third shifting means to additively combine the partially weighted sum and the intermediate weighted sum to generate the new filter coefficient.

15. The communication system of claim 14 wherein the first weighting factor is the inverse of the variance of the transmitted signal.

16. The communication system of claim 14 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

17. A receiving system to acquire received signals from a communication medium having simultaneous full duplex communication with echo interference from a transmitter connected to said communication medium and crosstalk interference from transmitters attached to other communication media in close proximity to said communication media, whereby said receiving system comprises:

a receiver circuit to acquire received signals from the communication medium, and

at least one apparatus to cancel the echo interference and the crosstalk interference comprising;

an adaptive correlator connected to a receiving circuit to acquire received signals from said communication medium, and connected to at least one of a plurality of transmission channels of said communication system to acquire at least one transmitted signal from the transmission channels, whereby said adaptive correlator generates filter coefficients representing an echo response of the received signals to echo and crosstalk interference from said transmitted signals at an arrival of each received signal; and

a finite impulse filter connected to the receiving circuit to acquire the received signals, and connected to the adaptive correlator to receive a plurality of the filter coefficients, which when combined with the received signals cancels any echo and crosstalk interference from said received signals;

whereby said filter coefficients are regenerated in the adaptive correlator at the arrival of each received signal and whereby each new filter coefficient is a weighted sum of a previous coefficient and one

received signal multiplied by a time delayed version of one transmitted signal.

18. The receiving system of claim 17 wherein the adaptive correlator comprises:

at least one first delaying means connected to one of the transmission channels to delay one of the transmitted signals;

at least one first multiplying means connected to the receiving circuit and one of the first delaying means to multiply the received signal by one delayed transmitted signal to produce a product of the received signals and the one delayed transmitted signal;

at least one second multiplying means connected to one of the first multiplying means to receive the product of the received signals by the one delayed transmitted signal and multiply said product by a first weighting factor to produce a first intermediate coefficient factor;

at least one second delaying means to delay and retain the previous coefficient;

at least one third multiplying means connected to one second delaying means to multiply the previous coefficient by a second weighting factor to produce a second intermediate coefficient factor; and

at least one summing means connected to one second multiplying means and one third multiplying means to add the first intermediate

coefficient factor and the second intermediate coefficient factor to produce one new filter coefficient.

19. The receiving system of claim 18 wherein the first weighting factor is a quotient of the second weighting factor divided by a variance of the transmitted signal.

20. The receiving system of claim 18 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

21. The receiving system of claim 17 wherein the received signals and the transmitted signals are digitized to form binary numbers indicating magnitudes of samples of the received signal and the transmitted signal.

22. The receiving system of claim 20 wherein the adaptive correlator is comprising:

at least one first delaying means connected to one of the transmission channels to receive and delay on of the digitized samples of the transmitted signal;

at least one first shifting means connected to the receiving circuit and one of the first delaying means to shift one of the digitized samples of the received signal according to the binary number of the one digitized sample of the transmitted signal to produce the received signal and the one time delayed transmitted signal;

at least one second shifting means to shift the product of the received signal and the one time delayed transmitted signal by a first weighting factor to form a weighted product of the received signal and the one time delayed transmitted signal;

at least one second delaying means to delay and retain the previous coefficient;

at least one adder/subtractor means connected to one second shifting means and one second delaying means to combine the previous coefficient with the weighted product to form a partially weighted sum;

at least one third shifting means connected to one adder/subtractor to shift the partially weighted sum by a second weighting factor to form an intermediate weighted sum;

at least one adding means connected to one second delaying means and to one third shifting means to additively combine the partially weighted sum and the intermediate weighted sum to generate the new filter coefficient.

23. The communication system of claim 22 wherein the first weighting factor is the inverse of the variance of the transmitted signal.

24. The communication system of claim 22 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.

25. A method to cancel echo interference and crosstalk interference present in a received signal from a communication medium, comprising the steps of:

acquiring the received signal with the echo interference and the crosstalk interference;

acquiring transmitted signals that generate the echo interference and the crosstalk interference;

delaying said transmitted signals to form delayed transmitted signals;

correlating the received signal with at least one transmitted signal at each cycle of the received signal to generate a new filter coefficient as a weighted sum of a previous filter coefficient and the received signal multiplied by the delayed transmitted signal;

filtering said received signal to reproduce the echo interference and the crosstalk interference; and

combining said received signal with the reproduction of the echo interference and the crosstalk interference to cancel the echo interference and the crosstalk interference in the received signal.

26. The method of claim 25 wherein the correlating the received signal with at least one transmit signal comprises the steps of:

multiplying at least one of the delayed transmitted signal by the received signals to form a first product;

multiplying the first product by a first weighting factor to form a first weighted product;

multiplying the previous filter coefficient by a second weighting factor to form a second weighted product; and

summing the first weighted product and the second weighted product to form the weighted sum.

27. The method of claim 26 wherein the first weighting factor is created by subtracting a third weighting factor from one, whereby said third weighting factor is factor is equal to an inverse of a number of a group of the transmitted signals.

28. The method of claim 27 wherein the second weighting factor is the third weighting factor divided by a variance of the transmitted signal.

29. The method of claim 25 wherein the correlating the received signal with at least one transmit signal comprises the steps of:

shifting the received signal according to the delayed transmit signal to form a product of the received signal and one delayed transmit signal;

further shifting the product according to a first weighting factor to form a first weighted product;

additively combining the first weighted product with the previous filter coefficient to form a first preliminary weighted sum;

shifting said first preliminary weighted sum by a second weighting factor to form a second weighted product; and

combining the second weighted product and the previous filter coefficient to generate the new filter coefficient.

30. The method of claim 29 wherein the first weighting factor is the inverse of a variance of the transmit signal.

31. The method of claim 29 wherein the second weighting factor is equal to an inverse of a number of a group of the transmitted signals.